

### **REMARKS**

Applicant respectfully requests reconsideration. Claims 1-67 were previously pending in this application. Claims 53-67 have been cancelled. Claims 1, 13, 28, 37, and 51 have been amended. Claims 68-74 have been added. Support for the claim amendments may be found in the specification including figures. No new matter has been added. Claim 13 has been amended for purposes of clarity and does not constitute a narrowing amendment. Claims 1-52 and 68-74 are pending for examination with claims 1, 28, 37, and 51 being independent claims.

#### **Election/Restriction Requirement**

Applicant has chosen to pursue Group I, claims 1-52. Claims 53-62 have been cancelled without prejudice or disclaimer.

#### **Rejection of Claims 17-19 under 35 U.S.C. §112, Second Paragraph**

Claims 17-19 have been rejected under 35 U.S.C. §112, Second Paragraph, as being indefinite. Specifically, the Office Action states that the claims are confusing because they require a “second set” of grooves or protrusions, without requiring a first set. Applicant has amended claim 13, from which claims 17-19 depend, to recite “a first set” of grooves.

Accordingly, withdrawal of the rejection of claims 17-19 is respectfully requested.

#### **Rejection of Claims 1, 5-11, 13-30, 32, 35-42, 45-47, 49, and 50 under 35 U.S.C. §102(a), §102(b), and §102(e)**

Claims 1, 5-11, 13-30, 32, 35-42, 45-47, 49, and 50 have been rejected under 35 U.S.C. §102(a) and §102(e) as being anticipated by U.S. Patent No. 6,241,379 and 35 U.S.C. §102(b) as being anticipated by the corresponding WIPO publication, WO97/28894 (collectively, “Larsen”).

Larsen fails to teach or suggest an article which comprises a microfluidic channel including a sidewall and a channel surface having at least one groove or protrusion defined therein, *wherein at least one groove or protrusion extends from the sidewall*, as recited in amended claim 1. (Emphasis added). Because each limitation is not taught or suggested in Larsen, claim 1 is patentable over

Larsen for at least this reason. Claims 5-11 and 13-27 depend from claim 1 and, thus, are also patentable over Larsen.

Larsen also fails to teach or suggest an article comprising a microfluidic channel including a channel surface having at least one groove or protrusion defined therein, the microfluidic channel having a cross-section defined between a first sidewall and a second sidewall, *wherein at least one groove or protrusion extends across a majority of the cross-section*, as recited in amended claim 28. (Emphasis added). Because each limitation is not taught or suggested in Larsen, claim 28 is patentable over Larsen for at least this reason. Claims 29-30, 32, and 35-36 depend from claim 28 and, thus, are also patentable over Larsen.

Applicant has amended claim 37 to include recitations similar to that of claim 51 which does not stand rejected under Larsen. In particular, Larsen fails to teach or suggest a structure, as recited claim 37, which comprises a first channel having a width that is less than about 1000  $\mu\text{m}$ ; a second channel having a width that is less than about 1000  $\mu\text{m}$ ; and a third channel having a width that is less than about 1000  $\mu\text{m}$ , wherein the third channel connects the first and second channels and comprises a channel surface having grooves or protrusions defined therein. Because each limitation is not taught or suggested in Larsen, claim 37 is patentable over Larsen for at least this reason. Claims 38-42, 45-47, 49, and 50 depend from claim 37, thus, and are also patentable over Larsen.

Accordingly, withdrawal of the claim rejections on this ground is respectfully requested.

Rejection of Claims 28-34 and 36 under 35 U.S.C. §102(b)

Claims 28-34 and 36 have been rejected under 35 U.S.C. §102(b) as being anticipated by Liu et al., "Passive Mixing in a Three-Dimensional Serpentine Microchannel," Journal of Microelectromechanical Systems, Vol. 9, No. 2, pages 190-196 ("Liu").

Liu fails to teach or suggest an article comprising a microfluidic channel *including a channel surface having at least one groove or protrusion defined therein*, the microfluidic channel having a cross-section defined between a first sidewall and a second sidewall, *wherein at least one groove or protrusion extends across a majority of the cross-section*, as recited in amended claim 28. (Emphasis added). Because each limitation is not taught or suggested in Liu, claim 28 is patentable

over Liu for at least this reason. Claims 29-34 and 36 depend from claim 37, thus, and are also patentable over Liu.

Accordingly, withdrawal of the claim rejections on this ground is respectfully requested.

Rejection of Claims 1-20, 25-32, 34-36, 51 and 52 under 35 U.S.C. §102(b)

Claims 1-20, 25-32, 34-36, 51 and 52 have been rejected under 35 U.S.C. §102(b) as being anticipated by U.S. Patent No. 5,921,678 ("Desai").

Desai fails to teach or suggest an article which comprises a microfluidic channel including a sidewall and a channel surface having at least one groove or protrusion defined therein, *wherein at least one groove or protrusion extends from the sidewall*, as recited in amended claim 1. (Emphasis added). Because each limitation is not taught or suggested in Desai, claim 1 is patentable over Desai for at least this reason. Claims 2-20, 25-27 depend from claim 1 and, therefore, are also patentable over Desai.

Desai also fails to teach or suggest an article comprising a microfluidic channel including a channel surface having at least one groove or protrusion defined therein, the microfluidic channel having a cross-section defined between a first sidewall and a second sidewall, *wherein at least one groove or protrusion extends across a majority of the cross-section*, as recited in amended claim 28. (Emphasis added). Because each limitation is not taught or suggested in Desai, claim 28 is patentable over Desai for at least this reason. Claims 29-32 and 34-36 depend from claim 28 and, therefore, are also patentable over Desai.

Furthermore, Desai fails to teach or suggest a structure as recited in amended claim 51 which comprises a third channel having a principal direction and connecting a first and a second channel, the third channel comprising a channel surface having grooves or protrusions defined therein, *wherein a first region of the channel surface comprises a first set of grooves or protrusions oriented at a first angle relative to the principal direction and a second region of the third channel comprises a second set of grooves or protrusions oriented at a second angle relative to the principal direction, wherein the first angle and the second angle are different*. (Emphasis added).

Because each limitation is not taught or suggested in Desai, claim 51 is patentable over Desai for at least this reason. Claim 52 depends from claim 51 and, therefore, is also patentable over Desai.

Accordingly, withdrawal of the claim rejections on this ground is respectfully requested.

Rejection of Claims 2-4, 12, 31, 34, 43, 44, and 48 under 35 U.S.C. §103(a)

Claims 2-4, 12, 31, 34, 43, 44, and 48 have been rejected under 35 U.S.C. §103(a) as being unpatentable over Larsen.

Each of these claims depends from independent claims 1, 28 and 37 which are patentable over Larsen because Larsen fails to teach or suggest articles or structures including the features of these independent claims as described above. Moreover, Applicant sees no suggestion or motivation in Larsen, or elsewhere in the prior art, to modify the teachings of Larsen to obtain articles or structures that include the above-described features of the independent claims absent from Larsen. Therefore, the dependent claims that stand rejected on this ground, also are patentable over Larsen.

Accordingly, withdrawal of the claim rejections on this ground is respectfully requested.

In view of the above amendment, applicant believes the pending application is in condition for allowance.

Dated: March 3, 2006

Respectfully submitted,

By 

Timothy J. Oyer, Ph.D.

Registration No.: 36,628

WOLF, GREENFIELD & SACKS, P.C.

Federal Reserve Plaza

600 Atlantic Avenue

Boston, Massachusetts 02210-2206

(617) 646-8000